

WIND HYBRID OVERVIEW

WIND-DIESEL 2002 WORKSHOP

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OVERVIEW

BY 1986, 1 MW of Wind Diesel,
demonstration or prototype projects

2001, 77 Projects Listed, >4 kW

65% Failure Rate

Component

Poor Maintenance

Inadequate Support by Supplier

Institutional Issues Paramount

KNOWN PROBLEMS

COST, Subsidies (Who, How Much)

Operation, Performance and Reliability are
Low

O&M and Payment for kWh

Extreme Environments

Manufacture/Sales Support

Regional Infrastructure

XCALAK, MEXICO



Fishing and Small Scale Tourism, 400 inhabitants
60 Homes, School, Church, Cafe, Street Lights
Diesel 3-4 hrs/day

XCALAK, MEXICO

Grid Extension Estimated at \$3 Million

1992, Wind/PV, Cost, \$450,000

Design: 24 hr service, 150 kWh/day

10% from Diesel

93-98, DAQ monitoring by SWTDI

99 Hybrid System Not Operating

99 Meters Installed

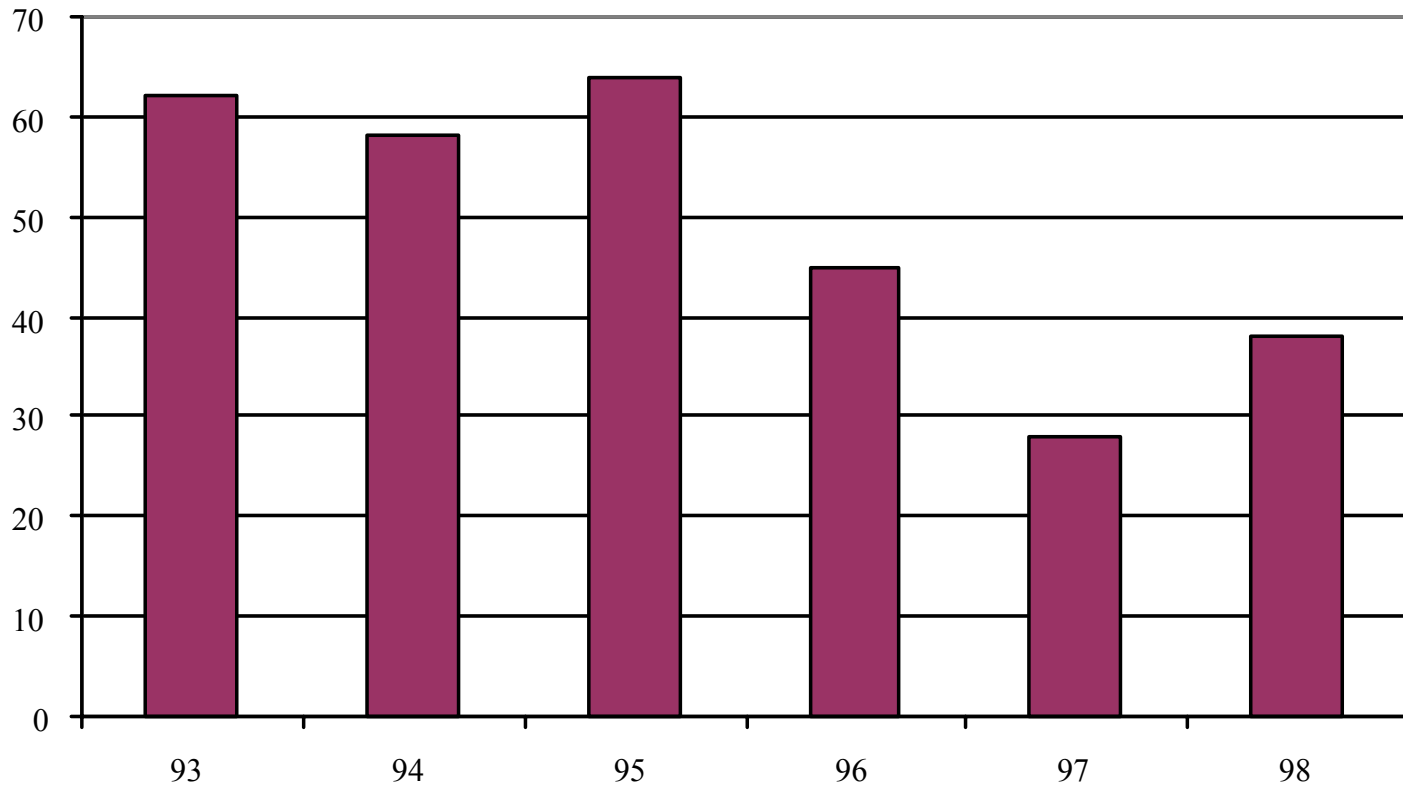
XCALAK, MEXICO



6 Wind Turbines, 60 kW; PV 1.2 kW;
Batteries 1738 Ah; Inverter, 40 kW

XCALAK, MEXICO

% Annual Renewables Generation



XCALAK, MEXICO

Initial 2 years O&M by Condumex

No Tariff Collection

Apr 93-Mar 94, load growth of 53%

94 Village Electric Committee

No Technical Assistance, Information

Flat Fee, \$5/mo

98 Only 50% paying, service 4 to 6 hrs

XCALAK, KEY LESSONS

Maintenance Is Critical

Wind Turbine Corrosion, Inverter Failure

Ownership, Responsibilities Need to be
Determined Early

Metering, Some Equitable Tariff

Local Village Support, Training

Long Term Planning

Battery Charging from Generator

CURRENT HYBRID RESEARCH

USDA

NREL HYBRID POWER TEST BED

MODELS

Hybrid 2

Homer

ViPOR

RETScreen

QUESTIONNAIRE

Only 7 Responses

US Research 50 - 100 kW

Components Sizes

Wind Turbines	10-50 kW
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Bio-Diesel Gensets	50 kW
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Wind turbines	1-10 kW
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PV Panels	Single to 2 kW Array
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PV Arrays	2-10 kW
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QUESTIONNAIRE

Improve Reliability

Cost Reduction

Standardization

Modular

Increased Production

50% Local Material/Construction

Suppliers offer a Minimum 2-yr Warranty on
Parts, Labor, and Travel

QUESTIONNAIRE

All Institutional Issues at Beginning

Public Buy In and Planning

Public Education

Energy Efficiency

Operation

Load Growth

Local O&M, Training

RECOMMENDATIONS

RETROFIT DIESEL MARKET

1. High Penetration: R&D on Controllers

HYBRID VILLAGE SYSTEMS

2. Computer Models Need to be Validated Against Village Hybrid Systems at the Three Stages: planning/design, installation, two years of operation

RECOMMENDATIONS

HYBRID VILLAGE SYSTEMS

3. Develop Database of Problems at the Three Stages: planning/design, installation, two years of operation

Extend the Current NREL Village Power Database to Include this Information

4. Develop a Standard Design with Modular Components

WIND HYBRID SYSTEMS TECHNOLOGY CHARACTERIZATION

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http://solar.nmsu.edu/publications/wind_hybrid_nrel.pdf



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